

2003 GEORGIA BASIN/PUGET SOUND

RESEARCH CONFERENCE

Panel and Workshop Summaries

Select the item below to link to that page or use the bookmarks on the left.

Indicators Panels: Development and Reporting 1
(Sessions 3A—10:30 a.m., April 1; 4A—1:30 p.m., April 1; 5A—3:30 p.m., April 1)

Panel: Development Patterns and Ecosystem Function—What Do We Know? (Session 3D—10:30 a.m., April 1) 4

Panel: Science/Decision-making Interface 7
(Session 6B—10:30 a.m., April 2)

Panel: Fish Habitat Stewardship in British Columbia 11
(Session 9C—10:30 a.m., April 3)

Workshop: Framework Development for Canadian Biodiversity Index (Session 10C—2 p.m., April 3) 15

Informal Workshop: Advancing Landscape Assessment and Planning (3:30 p.m., April 2) 17

Indicator Development and Reporting

- **Regional Ecosystem-Sustainability Indicators**
  (**Session 3A**—10:30 a.m. to Noon, Tuesday, April 1, 2003)
- **Connecting Science, Policy and Decisions in Indicator Development**
  (**Session 4A**—1:30 to 3 p.m., Tuesday, April 1, 2003)
- **Developing Common Indicators for a Transboundary Indicator Report** (**Session 5A**—3:30 to 5 p.m., Tuesday, April 1, 2003))

Session chairs:
Geoffrey Thornburn, University of Victoria
Heidi Siegelbaum, Washington State Department of Ecology

Indicators Stream: Linking Science and Decision Making

A series of three 1-1/2-hour sessions, Sessions 3A, 4A and 5A, addressed issues concerning the development and reporting of regional ecosystem and sustainability indicators within the Georgia Basin-Puget Sound ecosystem. Participants included natural, social and behavioural scientists, policy analysts, marketing/media specialists and other members of the basin community, as well as a number of participants from outside the region.

• Regional Ecosystem-Sustainability Indicators—Session 3A

Session 3A included presentations based on four submitted papers addressing the use of indicators and their links to decision-makers at four different scales. These scales ranged from the experience of local communities, the British Columbia Capital Regional District and the Fraser Basin, to the broader transboundary ecosystem of the Georgia Basin and Puget Sound.

Michelle Carr and **Shane Ford** of the Capital Regional District's Environmental Round Table spoke about two recent indicator projects: the proportion of impervious surface in six watersheds and the areas of Sensitive Ecosystems that have been mapped inside and outside of parks. Key considerations were issues regarding the development and publication of indicators that people could understand and find useful. They noted that there is a tendency to move away from massive reports to individual pamphlets and more targeted audiences. This approach is now considered more effective in raising awareness of key issues and informing decision-makers.

Brent Mueller analyzed the outcomes of two pilot community sustainability indicator projects, part of a larger project designed to build science/data-based reports that are relevant to, and lead to action at, the local level. Key issues were ensuring there was local capacity and sponsorship for the effort, while senior governments and experts support the effort technically and with data, linking the reporting to decision-making over time. This goal appeared to have been met in only one of the five pilot areas to date. Reports should provide positive as well as negative results from which to refine future approaches.

Steve Litke discussed the recently published State of the Fraser Basin report, exploring the process used to develop the indicators and the lessons learned, including the need for readily understood numbers, clarity, and succinct reporting coupled with a broad range of topics. The Fraser Basin Council is expected to follow up with further, more localized reporting, additional indicators and discussion of recommended policy responses to this comprehensive report.

Finally, **Geoffrey Thornburn** and **Heidi Siegelbaum** discussed the bi-national effort to develop ecosystem indicators in the Georgia Basin and Puget Sound watershed. The project began as a report on environmental trends or status for which compatible data were available. However, over time concern grew about the relevance of these reports without linking them to possible policy responses, and how to target the information to encourage behaviour change among decision-makers and the general population. A great deal was also learned during the project about how to develop the capacity to undertake this work across the international boundary.

As a whole, these papers addressed the critical questions of how to develop indicator products that can, when paired with specific tools and strategies, lead to sustainable policy decisions and actions in government, other organizations and individuals within the basin. A number of essential process issues were highlighted in the process, including the active involvement of experts, local decision makers and the public, using strong champions at the local level, an understanding of the audience and tailored follow through activity.

• Connecting Science, Policy and Decisions in Indicator Development —Session 4A

Session 4A was a cross-disciplinary panel that addressed the relationship between science, policy and decision-making associated with indicator development and use, including the role of social marketing. Panelists were asked to reflect on whether it possible for science to create actual change in human behavior through the transition from data to information to knowledge.

Risa Smith emphasized the need for trust between scientists/indicator reporters and their audiences, particularly the public, as a prerequisite for positive outcomes. Trust can be encouraged through transparent processes—identifying shared targets that are largely value-based, thereby resonating with the values of the audience. Risa also discussed the ramifications of societal "innumeracy," in which limited understanding of how to read and interpret numbers can impair both the meaning and power of indicators.

Chris Parsons described a benchmark system for King County that was designed to help local decision-makers evaluate county policies, including economic development and land use. Overall, this approach was used to identify and reach projected outcomes in municipal planning.

From another perspective, **Archie Riddell** identified indicators as the new governance tool in the BC government that helps integrate the four driving forces of (a) government program decisions, (b) shrinking budgets, (c) demands for performance management and accountability, and (d) responsiveness to the public interest—all dimensions of sustainable decision-making. Challenges include true integration across organizations, efficient use of data, attribution of outcomes to individual organizations, development of improved decision support tools, and improved communications.

Kate Seymour addressed changing human behavior. Social sciences can be used to help define how human behavioral change can occur, given that providing information alone does not drive intellectually motivated decisions, but rather issues from personal response to being made uncomfortable with current behaviors. To change behavior, solutions must be within the target group's control, with predictable results. Kate focused on **structure** rather than process as being key to successful behaviour modification, along with communication focusing on personal implications.

Noreen King also discussed how to take scientific information and target audiences to voluntarily accept behaviour change, given a concern about the disconnect between what science communicates and what people innately believe. A deliberate process of preparing information, and then marketing it within a careful plan was emphasized.

The panel's presentations ended with **Lee Hatcher**'s explanation of the Compass Model. The use of this model helps develop integrated indicator reporting using a process that captures the views and values of policy leaders, technicians and the public in an iterative and efficient way.

This panel discussion demonstrated the changing nature of private sector and government decision support systems with respect to science-based information, along with the growing need for more effective mechanisms to facilitate modified behavior through a wide range of individuals and organizations, based on this information. The strong implication is that simply reporting statistics and data do not provide the delivery/decision support mechanisms required for real change in established behavior. Rather, tools must be deployed that help identify the needs and values of audiences, and addresses these directly, thereby encouraging the consideration and adoption of new information in decision-making at all levels.

In addition, it is critical that barriers to desired behavior be removed and that messages are framed well and delivered through established social networks.

• Developing Common Indicators for a Transboundary Indicator Report—Session 5A

Session 5A took the form of a technical workshop on five indicator topics designed for the next Georgia Basin-Puget Sound Ecosystem Indicators Report. The indicator topics are freshwater quality, marine water quality, water use (consumption), shellfish contamination and land-use development patterns. Participants, working in small breakout sessions, were asked to identify:

1. What metric or indicator is timely and relevant?
2. Are data available?
3. What is the scale of data collection?
4. Are the data compatible across the border, or are there potential for parallel reporting?
5. Can we develop the metric/indicator for publication by fall 2004?

A number of potential indicators were identified, albeit limited to some degree by the absence of representation from either side of the border. While the focus of the discussions was on the scientific dimensions of the indicators, the issues of relevance and persuasiveness to the intended audience for the information will be addressed in the follow-through to the conference.

Development Patterns and Ecosystem Function—What do we know?

Panel 3D—10:30 to Noon., Tuesday, April 1

Session chair:
Harriet Beale, *Puget Sound Action Team*

The First Session of Four on Landscape Function

Just 200 years ago when English Captain George Vancouver entered the Strait of Juan de Fuca into what is now called Puget Sound and the Strait of Georgia, he encountered a landscape covered with ancient forests, wetlands, and river systems that appeared endless. In the short 200 years since, man has dramatically changed that landscape to the extent that many ecological resources and ecosystem functions could be lost or altered for many, many generations to come.

Current generations of citizens and private and public planners and resource managers have an important challenge in setting a course for the protection and sustainable use of the ecosystems within the Puget Sound and Georgia Basin, particularly given the anticipated growth in human population within the basin over the next 20 to 50 years. Researchers, decision-makers, and citizens alike are beginning to recognize that decisions made about land use and land-use practices are key to the long-term protection and sustainable use of both individual resources and functional ecosystems throughout the shared basin.

Session 3D was the first of five at the conference presented as a coherent track on the general topic of advancing landscape assessment and planning. The track was developed as part of an ongoing effort to work together across Puget Sound and the Georgia Basin to develop and share information and tools to promote watershed-based decision-making in land-use planning. This effort began in February 2001 at a joint Puget Sound/Georgia Basin practitioners' forum in Port Townsend that identified a need for research, planning and education tools. This series of conference sessions was designed to move the conversation forward and connect with other practitioners interested in the topic.

Session 3D, as the first in the series, framed the problem in terms of current science. Two subsequent sessions (5D and 6D) presented tools and approaches for information and decision support. In session 7D a panel presented a local demonstration project in Kitsap County, Washington as a local example of land-use planning based on watershed function. All of these sessions led to a round-table discussion at the end of the conference where planners and scientists discussed the overall goal for the track, to "…help advance the application and use of existing scientific findings and information relating to local land-use planning and watershed function."

The four talks in session 3D offered a variety of approaches to measuring the impacts of development patterns on ecosystem function. Researchers from different disciplines presented their work in examining the topic using methods related to spatial analysis, streamflow metrics, geomorphologic analysis, and economic statistics. The variety of approaches reflects the complexity of factors that informs and affects land-use decisions.

Marina Alberti: A Review of the Effects of Landscape Patterns on Local Bio-metrics

Website: http://www.urbaneco.washington.edu/

Marina Alberti, a faculty member at the University of Washington Department of Urban Design and Planning, began the session with a presentation on "development patterns and ecosystem function: what do we know? A review of the effects of landscape patterns on local biological metrics." Her work asks the question "What are the effects of human impacts and urbanization on biophysical processes?"

Dr. Alberti has looked at how landscape patterns vary across an urban gradient and at different scales. For example, she used probabilistic analysis of spatial data to measure landscape fragmentation by mean patch size. She then applied statistical analysis to correlate these patterns with various ecosystem functions, as in the finding that the density of transportation road crossings is a predictor of stream health as measured by a Benthic Index of Biological Indicators (BIBI).

As these models are developed and tested further, there are significant potential benefits for decision-makers in land-use planning. There are clear implications for land-use decisions in data Dr. Alberti has developed that suggest that aggregation of paved surfaces is more important to ecosystem function at the catchment scale than is the total impervious surface coverage. While this type of analysis needs more work given the complexity of the relationship between land cover, land use, and measures of ecosystem health, it holds real promise in providing quantitative measures to predict the effects of land-use decisions on ecosystem function.

Future work by Dr. Alberti will examine how the ecosystem behaves in response to impacts as measured at multiple scales. Further research is expected to improve the models used to evaluate data that is spatially correlated.

Chris Konrad: Streamflow Metrics For Linking Landscape Changes to the Condition of Stream Ecosystems in the Puget Sound Basin

Website link: http://wa.water.usgs.gov/news/news.wri024040.html

Dr. Chris Konrad of the U.S. Geological Survey presented a second application of scientific analysis to development patterns. Dr. Konrad looked at the effects of urban development on ecological processes in small watersheds based on an analysis of stream flows at time scales greater than those of the usual hydrologic analysis. Three streamflow metrics were evaluated as potential metrics for measuring landscape changes and correlated with the Benthic Index of Biological Integrity (BIBI). The streamflow metrics are the fraction of a year that annual mean discharge is exceeded, the coefficient of variation of annual maximum floods, and the fraction of time that streamflow exceeds the magnitude of a flood peak occurring twice a year on average.

Results of the study include a correlation of road density with the a reduced BIBI, a finding similar to that of Dr. Alberti's work. Future work by Dr. Konrad will look at longer time scales and will refine the analysis looking at results for different landscapes and land-use types. There is a need for more work to develop management strategies that integrate these findings, and to use them to identify limiting land-use factors for stream restoration.

Brian Collins: Historical Change and Regional Variation in Riverine Landscape Functions and Land Uses in the Puget Sound Basin

The session then moved from examining stream flow in small watersheds to a geomorphic approach to understanding the interaction of landscape function and land use in large river basins. Brian Collins, a Research Scientist at the University of Washington, described how analyzing the historical condition of the riverine environment shows that historically there were more landscape functions, existing over a broader range of spatial scale, and that riverine landscape function varied throughout the region. This variation in large part resulted from the history of Pleistocene glaciation, which created two broad types of river valleys. Sub-glacial meltwater created broad, low-gradient troughs in which some rivers now flow ("Pleistocene" valleys), and elsewhere rivers incised through the lowland fill of glacial deposits, to create narrower, steeper valleys ("Holocene" valleys). Historically, rivers in these two contrasting topographic settings had different fluvial dynamics, riverine landforms and habitats. Rivers in Pleistocene troughs have generally been depositional throughout the Holocene, causing the river as a result to be elevated above their floodplain; typically, rivers in these settings meandered slowly within a relatively narrow meander belt, with extensive low-elevation wetlands outside the meander belt. In contrast, "Holocene" river valleys, which have had a generally incisional setting, are characterized by varied topography that results from a branching channel pattern and numerous floodplain sloughs, and relatively rapid channel change within a relatively large proportion of the valley bottom. The river dynamics in these latter valleys was commonly mediated by the effects of wood jams created from the surrounding floodplain forests.

Historical land development has tended to homogenize the riverine environment, as well as diminishing or eliminating landscape functions, thus obscuring regional differences. This has occurred cumulatively by deforestation and disconnection of rivers from their floodplain forests, disconnecting river hydrologically from their floodplains, and diking and draining floodplain habitats. While differences between river morphologies and dynamics have been obscured by these effects of the last 150 years of settlement, the underlying topographic setting of river valleys has nonetheless influenced patterns of development in predictable ways. For example, most development in the Snoqualmie River valley, which is a Pleistocene trough created by sub-glacial runoff, has taken place on alluvial fans and terraces. This is because the valley bottom is generally several meters lower in elevation than the riverbanks, making severe flooding an inevitable problem (although river migration is a lesser hazard, because the river migrates laterally at a slow rate). On the other hand, in the nearby Skykomish valley, the historically branching river pattern was very dynamic, but the topographic setting makes the flood hazard less inherently severe. The establishment of levees to limit the area of channel migration and avulsion, which historically occurred over a large area and was highly dynamic, has facilitated development on the floodplain.

Future development will create pressures for river managers to reduce flood or river migration hazards. The potential efficacy—and costs to landscape function—of these measures can be evaluated in the context of the variation in topographic setting and historical landscape function of rivers in these contrasting geomorphic settings. Understanding the historical river dynamics and habitats created in these different river valley types is also important for determining goals for restoring landscape function and habitat recovery, and in setting strategies for achieving those goals. For example, in "Pleistocene" valleys, a restoration emphasis includes reestablishing hydrologic connection between the river and floodplain oxbow ponds and wetlands, while in "Holocene" valleys restoration emphasis includes restoring the dynamic connection between rivers and forests. Understanding how the geologic history and the resulting topographic setting influenced the historical land settlement patterns can be helpful in planning for future development and re-development in the context of how the basin hydrology functions.

Gillian Mittelstaedt: The Fiscal Side of Protecting Fish – Can Compact Development Protect Your Community's Basins and Budgets?

The final presentation applied economic factors to an analysis of the costs associated with different land-use patterns. Gillian Mittelstaedt of Sustainable Community Solutions used her experience in watershed and land-use planning to gather and compile data on the economic impacts of development patterns. She compared traditional patterns with compact development patterns. Traditional patterns are characterized by new growth on the outskirts of urban areas, auto-oriented transportation in curvilinear patterns, commercial and residential uses separated, and disconnected parks and open space while compact development patterns are associated with grid networks, residential integrated, multi-model transportation, commercial and residential mixed, and parks and open space linked by green corridors.

She first asked the question: "What do we pay for traditional development patterns?" Data indicate that since World War II the average house size has doubled. Traditional development patterns of the past 20 years include fewer household members, but the amount land used by each house is greater, resulting in lower densities in residential areas. Transportation related infrastructure accounts for up to 70 percent of all impervious surfaces. Costs for all types of infrastructure are higher with greater distance from the urban core, which has contributed to higher per capita costs under more sprawl-type patterns.

Mittelstaedt then presented data on alternative, more compact development patterns. Cost per unit in one Puget Sound county was found to be $10,000 less per home in alternative developments. The Michigan Council of Governments found that compact growth would save about 17 percent on water, sewer and road costs. The American Farmlands Trust found that in Skagit County, infrastructure costs for residential services were $1.32 for each dollar of tax revenue as compared with 32 cents for farm, forest and open space lands.

Recommendations for policy and planning based on this economic data clearly support more compact development and regional transportation planning. This includes a balance of jobs and housing and the use of green infrastructure such as low impact development practices for stormwater management.

Future research

The variety of speakers and approaches, from spatial data, stream flow and geomorphic analysis of watersheds to economic data, represents the broad scope of topics that must be considered in land-use decisions. Each of the session speakers applied the fundamentals of a discipline to develop quantitative models to inform decision-making. These are areas of research that challenge the scientist and social scientist to look at data in new ways, creating new methods and models that have enough rigor and validity to predict and distinguish the effects of land-use patterns on the ecosystem. As future research expands and strengthens this work, we can expect the techniques of land-use planning to change in ways that better integrate and balance development and ecosystem functions.

Science / Decision-making Interface

Panel 6B—10:30 to Noon, Wednesday, April 2

Session chair:
Erik Karlsen, *Planning Consultant, Victoria, British Columbia*

This session addressed approaches to applying science-based information to decision-making from government and corporate perspectives.

Panelists included:
- **Ken Cameron,** Manager of Policy and Planning for the Greater Vancouver Regional District
- **Mike Harcourt,** former Premier of British Columbia, and member of Canada's National Round Table on the Environment and the Economy
- **Chris Parsons,** Growth Management Planner for the Washington State Office of Community Development
- **Bruce Sampson,** Vice-President, Sustainability, BC Hydro
- **Erik Karlsen,** former member of the Georgia Basin Ecosystem Initiative management committee, moderated

Chris Parsons: Assessing Scientific Information for Reliability and Local Application

This presentation described the use of science-based information to designate critical areas (wetlands, fish and wildlife habitat, geologically unstable, aquifer recharge, frequently flooded) and protect their functions and values pursuant to Washington State's Growth Management Act (RCW 36.70A) regulation RCW 36.70A. 172.

Parsons referred to Washington State's Best Available Science (BAS) Guidelines, emphasizing that scientific information must be the product of a valid scientific process including some or all of the following characteristics:
- Peer reviewed (research, modeling, and synthesis documents).
- Methods are clearly stated.
- Conclusions are based on logical assumptions and reasonable inferences.
- Statistical Analysis.
- Context is established.
- References are cited to relevant, credible literature and other pertinent existing information
- Criteria are provided to demonstrate that the BAS has been included in the development of policies and regulations.
- Explanations are provided for any decisions that depart from science-based recommendations and for any actions taken to address potential risks to a critical area's function.
- Explanations are provided on what to do if a county or city cannot find enough scientific information applicable to its critical area.
- Recommendations are made to pursue a precautionary approach with an adaptive management plan, budget and timeline.

Using anadromous fisheries as an example Parsons explained that giving "special consideration" means determining and applying conservation or protective measures with reference to:
- Life stages and habitat requirements.
- Critical area functions in relation to land use, including cumulative effects.
- Translating the science to management strategies, including performance measures such as restrictions, prohibited uses, and buffers.

She noted that where relevant information is inconclusive, professional judgment and experience are critical in determining management recommendations.

Parsons also outlined how performance measures are determined and applied to other types of critical areas:
- **Aquifer Recharge Areas:** no landfills, toxic materials storage based upon soil vulnerability or time of travel zones.

- **Steep Slopes:** geotechnical assessment, road and structure setbacks, drainage requirements.
- **Fish and Wildlife Conservation Areas:** consideration of multiple species habitats, breeding, feeding, nesting, and migration needs can be used to establish buffers and corridors as well as guide approaches to variances, ongoing mitigation, monitoring and enforcement.
- **Frequently Flooded Areas:** building restrictions in floodway, elevated building height, and land use zoning restrictions.

In wrapping up, Parsons noted that the Washington State Office of Community Development (CTED) provides technical guidance through publications and reviews:

- "Citations of Recommended Sources of Best Available Science".
- "Critical Area Guidebook" including "example code language" (by late Spring 2003).
- Review to all draft critical area ordinances as part of 60-day review (or before).

Ken Cameron: Greater Vancouver Regional District's Risk Assessment Approach to Water Policy

The Greater Vancouver Regional District's (GVRD) risk-assessment approach to ensuring the protection of human and environmental health involves developing a coherent, longitudinal body of science-based knowledge and using this to adapt policies and management strategies to new findings or changes.

Cameron explained that such an approach involves replacing an **old paradigm** of public policy and management with a **new paradigm**.

Old Paradigm	New Paradigm
• Science served senior government research and decision- making. • Local government was primarily a regulated entity. • Science ad hoc and not longitudinally consistent. • Focus on arbitrary standards. • Limited consideration of local conditions.	• Local government stewardship/partnership. • Focused development of body of knowledge. • Relevant local issues identified. • Local management plans developed. • Application of risk assessment in the context of broad priorities.

Reflecting on the new paradigm, Cameron described how the GVRD's LWMP considers water quality objectives set by province and applicable federal legislation; how it involves a partnered approach to environmental monitoring and assessment (Environmental Monitoring Committee) and how it uses a watershed-scale, partnered approach to stormwater (Stormwater Interagency Liaison Group). He also outlined the triggering process used to respond to unmet water quality objectives. This process involves monitoring water quality, and where an objective is not being met, it involves the evaluation of risks, assessment of options and selection of actions for implementation. The results are then monitored for effectiveness, and if further action is necessary, the process is repeated.

This risk assessment approach will assist in dealing with evolving issues such as endocrine disrupting chemicals and facilitate continuous improvement, as needed, as well as through formally mandated 5-year interval reviews. It will ensure better understanding of long-term sustainability issues and enable more partnered commitments to future actions.

In conclusion, this approach is a cost-effective use of scarce resources. It builds on and generates a comprehensive body of knowledge. It involves monitoring of the effectiveness of environmental improvements, and provides an essential context for decision-makers.

Science-Decision Making Interface: The Impact on Corporate Strategy—Bruce Sampson

Sampson took a global approach and then brought this home to BC Hydro. He started by quoting the 1992 World Scientists' Warning to Humanity:

> *"No more than one or a few decades remain before the chance to avert the threats we now confront will be lost and the prospects for humanity immeasurably diminished. We the undersigned, senior members of the world's scientific community, hereby warn all humanity of what lies ahead. A great change in our stewardship of the Earth and life on it is required, if vast human misery is to be avoided and our global home on this planet is not to be irretrievably mutilated."*

Global concerns range from population growth to global warming, to loss of resource productivity and species. Global responses such as the Kyoto Protocol, the Montreal Protocol on Ozone Depletion, The Natural Step, and the World Business Council are complemented by more localized responses such as the sustainability initiatives being pursued by the Fraser Basin Council and the Greater Vancouver Regional District, and through BC Hydro's Power Smart, Resource Smart and Cleaner Energy programs which defer the need for new thermal generation in BC and avoid Green House Gas (GHG) and local air emissions.

BC Hydro's response is to be the leading sustainable energy company in North America, by managing three bottom lines: environmental, social and economic.

In the past Hydro's spent $350 million to save ~ $1 billion worth of electricity, saving 2,700 GWh per year—a 5.3% reduction in domestic consumption—representing GHG reductions of 1.4 million tonnes per year. Hydro plans to spend $600 million over next 10 years, to target an additional savings of 3,500 GWh per year (5.4% reduction) and GHG reductions up to 1.8 million tonnes per year by 2010.

Getting more energy out of existing facilities through 'eco-efficiency improvements' (replacing old turbines, adding new generating units, improving tailraces, etc), will achieve GHG reductions up to 920,000 tonnes by 2007.

Acquiring GHG-free or low GHG-Intensity Energy purchases from private producers (small hydro, wood waste, natural gas cogeneration) avoided 1.5 million tonnes of GHG in 2001. By 2010 a voluntary commitment to meet 10 percent of new demand with "green" energy will avoid up to 410,000 tonnes of GHG per year.

As a result of its approach, BC Hydro is ranked: No. 2 in the first in-depth Canadian benchmark study of 35 sustainability reporting companies; No. 1 for Environmental and Social Performance when compared against 16 North American utilities (Innovest); and No. 22 in a benchmark study of the top 200 sustainability reporting companies worldwide (Global Reporters).

Sampson posed the question: Are we doing enough?

Using polling information from the Asahi Glass Corporation, he noted that between 1992 and 1998 world-wide concerns rose from "quite concerned" to "extremely concerned," then leveled off and declined back to quite concerned in 2000, only to rise again in 2001, and in concluding his presentation, Sampson listed the following suggestions to improve the communication of sound science:

- Improve the Interface between scientists and public/ business.
- Simplify the message.
- Support introduction of new tools.
- Apply the precautionary principle.
- Have a positive outlook "the glass is half full," and give positive solutions.
- Provide K-12 environmental / sustainability education.

Mike Harcourt: Summary Observations

Harcourt reflected on his early involvement with cross-border cooperation in the Georgia Basin/Puget Sound Region. He noted the 1990 legislation introduced by Elizabeth Cull to promote inter-governmental cooperation on sustainability issues facing the region, and his work with Governor Booth Gardiner, which resulted in the BC-Washington Environmental Cooperation Agreement.

Harcourt contrasted the GVRD's intergovernmental cooperation and risk management approaches to liquid waste management described by Cameron, to an earlier time when in his capacity as mayor of Vancouver, he was charged for a sewage disposal violation without warning, with limited science-based information, and no cooperative process, let alone one that addressed economic considerations.

He also noted that Washington state's detailed regulations and guidance for a science-based approach to critical area planning and management decisions described by Parsons, is a substantial improvement over having to interpret wide-ranging opinions.

Harcourt complimented BC Hydro's sustainable development approach and its leadership. He also pointed out the importance of getting the "scientists' message" presented by Bruce Sampson out to more people.
In conclusion, Harcourt noted that sustainability requires both cooperative approaches to and the use of science-based information for decision-making and remarked that good progress being made in the GB-PS Region needs to be applied to urbanization issues at a global scale.

Questions and Responses

- A concern about the use of anecdotal traditional knowledge was raised.

  Panelists noted the importance of having both science and value-based knowledge apply to decision-making and commented on several important features of traditional knowledge. It is both observation and value-based. It provides the type of long-term perspectives needed to pursue restoration. It is directly applicable to the exploration of smaller scale responses to environmental management issues. And, it addresses cyclical conditions important to taking a "natural step" approach.

- A question was posed about the use of community/citizen-determined water quality standards.

  Panelists noted that such standards are set by senior orders of government in the United States and Canada, there are formal opportunities provided for local consultations regarding ways and means to achieve these standards, and it is unlikely that the setting of water quality standards with be devolved to the local level.

- A concern about information availability was raised: some information available on one side of the border is not available on the other and even where it is, it is not comparable.

  There was not enough time to address this concern.

Fish Habitat Stewardship in British Columbia

Panel 9C—10:30 a.m. to Noon, Thursday, Apeil 3, 2003

Session Chair:
Aileen Anderson, *Langley Environmental Partners Society*

Session Objective
To make recommendations to federal government on ways to advance fish habitat stewardship in the Pacific region.

Session Abstract
On September 25, 2002, Canada's Stewardship Agenda was endorsed at a meeting of the Canadian Wildlife Ministers' Council in Halifax. The Agenda provides a "framework for enhancing stewardship nationally by recommending goals, objectives, and supporting activities" (Draft Stewardship Agenda, July 2002). The Agenda acknowledges the importance of stewardship as a collaboration between communities, organizations, aboriginal people, the private sector and individuals. The end of the Habitat Conservation and Stewardship Program (HCSP), created a unique opportunities for a new approach to stewardship in the Pacific Region. Pacific Department of Fisheries and Oceans (DFO) is committed to stewardship and is exploring innovative policy options to support this commitment. The panel session reflected on the HCSP program, focussing specifically on what aspects of the program could be taken forward to support a new approach to stewardship. The session included presentations from panelist and encouraged audience participation and dialogue.

The members of the panel were drawn from a Voluntary Sector Initiative (VSI) stewardship project, being lead by Langley Environmental Partners Society (LEPS). The objective of the LEPS VSI project is to further stewardship in Canada by creating communication networks between watershed stewardship groups and all levels of government.

Session Agenda
- Overview of VSI project (Aileen)
- Overview of HSCP (Lisa DeGoes)
- Panelists answered the following questions:
  1. How has HCSP changed fish habitat stewardship in the Pacific Region?
  2. What was created though HCSP that can be built on for the future?
  3. In light of the Stewardship Agenda, what recommendations would you make to advance fish habitat stewardship in the Pacific Region?
- Discussion

The Panel

Lisa DeGoes—DFO Pacific, Habitat Enhancement Branch
DeGoes currently works as a Watershed Stewardship Planner for Fisheries and Oceans Canada—Stewardship and Community Involvement Unit. She has a master of arts in planning, specialising in community-government watershed management partnerships and a Bachelor of Environmental Studies, specialising in aquatic sciences and environmental impact assessment. She has spent several years working in mainly rural/urban fringe agricultural communities in both Ontario and British Columbia to promote awareness about the issues and challenges surrounding water management

Carl Sam—Squamish River Watershed Society, Mount Curie
Carl is from Skookumchuck, BC, along Lower Lillooet River, between Harrison and Lillooet Lakes. He graduated from Vancouver Technical High School, then went on to study Fine Arts at Langara Community College, Emily Carr College of Art, Fraser Valley Community College. He's an artist, with his main medium being scultpint in stone. When he moved to Mount Currie, BC, he became interested in fisheries restoration and has been working for Creekside Resources Inc. for the last five years. He's been involved in numerous fish protection actives, such as, instream installations, slope stabilizations, riparian planting, environmental monitoring, sensitive habitat inventory mapping, and public awareness campaigns. Through his work he has recognized the need for a Fisheries Commission core, and developed one from

local Fisheries Technicians and concerned citizens. Since the blossoming of Lil'wat Fisheries Commission's (LFC), the need for a broader scope lead them to start involving all of the First Nations in the Lillooet River Watershed to develop Fisheries Commissions. Sam is attempting to repair the damage done and spread the word, bringing awareness and capacity building to our First Nations, N'Qua'tqua, Xa'tsa, Skatin, and Samahquam.

Andrew Appleton—HCSP Stewards-Lower Fraser
Andrew joined HCSP in June 2000. Previously, he worked with the Stoney Creek Environment Committee in Burnaby, BC as Streamkeeper coordinator and for GVRD Parks as an Interpreter. He began volunteering at age 16 with the Vancouver Aquarium. Andrew provides technical, logistical and funding assistance to community stewards in Langley, Surrey and White Rock under the umbrella of the Habitat Conservation and Stewardship Program. Andrew studied Biology at Simon Fraser University and is a graduate of BCIT's Fish, Wildlife and Recreation Technology program.

Marc Pakenham—HCSP community partner-South Coast, Veins of Life
Marc Pakenham is currently executive director for the Veins of Life Watershed Society having recently left Fisheries and Oceans Canada. In the past five years, Pakenham has been active in a wide range of stewardship initiatives ranging from marine protected areas to the development of the Marine Mammal Monitoring Program (M3)in the Salish Sea and West Coast of Vancouver Island.

Aileen Anderson, session moderator
Anderson currently works for Langley Environmental Partners Society as the project co-ordinator for a national watershed policy forum, funded through the Voluntary Sector Initiative. She completed her MSc in Resource Management and Environmental Studies from the University of British Columbia. Her thesis research involved an evaluation of the public participation process conducted to establish the first watershed management institution in South Africa. She completed a BSc honours degree (Environmental and Geographical Science) from the University of Cape Town, with an honours thesis on the protection of endangered freshwater fish. Before working for LEPS, she assisted the Institute of Resources Environment and Sustainability, UBC, to develop a CD-rom for a web-based course on Water and International Development. She has also worked as a consultant for the South African government and as an environmental consultant and sales representative for a tour operator in Whistler.

Summary of information presented as an introduction to the Langley Environmental Partners Society, Voluntary Sector Initiative Project

Langley Environmental Partners Society (LEPS) is coordinating one of the three Department of Fisheries and Oceans (DFO) supported projects that received funding from the Voluntary Sector Initiative (VSI). The objective of the project is to strengthen public participation opportunities within DFO. To achieve this LEPS, in partnership with other organizations, will encourage, organize, and engage community members to participate in policy development dialogues with each other and government. One output of this project may be the establishment of a national watershed stewardship network.

Project Outcomes

1. A set of recommendations as to how government can better support watershed stewardship. The recommendations will be compiled from regional and national discussions on case studies from across Canada. The results will be presented to DFO and will also contribute to the recommendations for a 'bold 10-year vision for stewardship,' planned to arise from the Leading Edge Conference.

2. The project will lay the foundation for a national watershed stewardship network

Project Partners

LEPS has partnered with four leading watershed stewardship organizations across Canada. Through these partnerships important examples of watershed stewardship projects have been selected for discussion.

1. The Land Stewardship Centre of Canada in Alberta who will link with watershed stewardship organizations in Alberta and the Prairies (Saskatchewan and Manitoba)

2. Conservation Ontario with specific case study contributions from Ausable Bayfield Conservation Authority and South Nation Conservation Authority

3. Baie des Chaleurs, Strategies Saint-Laurent (Quebec), located in the saltwater portion of the St. Lawrence river.
4. Clean Annapolis River Project in Nova Scotia with a focus on the Atlantic Coastal Action Plan
5. Langley Environmental Partners Society and Pacific DFO in Vancouver will discuss the Habitat Conservation and Stewardship Program.

Regional Workshops

Regional workshops will be held on each case study to distill what policies made the project successful or what aspects of the project presented barriers. Box 1 outlines the proposed headings that will guide the discussions and the format of the final recommendations. A broad range of stakeholders in the project, especially volunteer stewards who are actively engaged in the project, will participate in the discussions. Moderated on-line forums are also scheduled for May at www.stewardship2003.ca.

The recommendation drawn from regional workshops conducted in Vancouver, Kamloops, and Nanaimo will be combined with the recommendations drawn from this panel discussion into a Pacific summary document.

National Workshop

A focused national policy discussion workshop will be held as a pre-conference session to the LE Conference from July 2-3 in Langley, BC. The national forum will bring together the project partners and allow them to summarize and compile the policy discussions that were held at their regional workshop, and through the moderated on-line discussions.

Leading Edge Conference: Stewardship and Conservation in Canada

The results of the policy discussion workshop will be presented at the LE Conference: Stewardship and Conservation in Canada, from the 3rd to 6th July, 2003.

Each topic will discuss: (1) Successes, (2) Barriers, and (3) Recommendations relating to:

- **Founding mechanisms**: What mechanisms lead to the establishment of the initiative: public pressure, government pressure? Did the organization begin in response to a particular incident: ie pollution event, drop in fish stocks? How does this mandate affect the organization today?
- **Watershed boundaries**: How do administrative boundaries (federal, municipal, provincial) effect the boundaries of the watershed area? How to deal with jurisdictional battles.
- **Internal governance structures**: Referring to the systems, hierarchy or mechanisms of authority within the organization?
- **External governance**: Government (municipal, provincial, federal, First Nation) role over the organization. Is the organization supported through specific legislation or policy?
- **Funding structures to support the initiative**: How were the funds secured and sustained?
- **Information Access**: What information is used to decide on priorities for action? Is that information drawn from government sources/citizen science/universities?
- **Engaging Volunteers**: How are volunteers engaged in the initiative?
- **Forging Partnerships:** How were partnerships established through the initiative?
- **Monitoring Results:** How is it done and how do the results guide the activities of the organization?
- **Sustainability of the initiative:** Ensuring long term success
- **Accountability:** How can one build trust and keep people accountable in a collaborative environment?

Recommendations summarized from the panel session:

Each panelist discussed the HCSP in terms of the following questions:

1. How has HCSP changed fish habitat stewardship in the Pacific region?
2. What was created though HCSP that can be built on for the future?
3. In light of the Stewardship Agenda, what recommendations would you make to advance fish habitat stewardship in the Pacific Region?

Presentations were kept short to ensure adequate time for audience input and discussion. A note taker was asked to transcribe important points from the presentation and the audience discussion. The following recommendations were made based on the HCSP example to advance fish habitat stewardship:

Summary from panel presentations:

- Fun (beer an and jello)
- Strategic action Plan
- Funding for Staff
- Stewardship part of DFO and community ethic
- Local focus and capacity
- Communications
- Bottom-up approach, Feedback
- Target problem
- Celebrate success
- Funding for basic operations
- Consistency and continuity of funding (more than 5 years)
- Education of government and stewards
- Co-ordination (government agencies) Federal and provincial
- DFO to recognize ecosystem-based stewardship (ie not just fish based)
- Bottom-up approach
- Holistic ecosystem approach
- Ngo's to work together
- Training for stewards
- Clear goals
- Use the power of success stories to create more support
- Involve the whole community

Summary of audience comments:

- Tell politicians (premier/prime minister) and senior management about values of stewardship
- Stewardship is the way of the future
- Local focus on issues and results (include local politicians)
- Balance reporting requirements and need to demonstrate success
- Full cost accounting
- Including intangibles
- Need core funding (harder than getting project$)
- Funding continuity
- *Canada's Stewardship Agenda* needs to be informed from "on-the-ground"
- Ottawa to meet with local groups (Communication)
- Funding is the fish ladder
- Time spent fundraising detracts from on-the ground stewardship
- Ecosystem based management
- Community based management (paradigm shift for governments)
- Need to involve lobbying/campaigning
- Need for interim "survival strategy"
- Stewardship action network (bottom-up network)
- BC stewardship Centre (ray of hope)
- Funding –Build a good business case for stewardship (Em)
- Build on what is already there (existing groups)
- Not just fish-centric
- Use a business case, hard-nosed approach
- Continuity
- Volunteers get burned out and need paperwork support
- Neighbor-to-neighbor support

The final summary report for the Pacific region is available on the on-line forum at http://www.stewardship2003.ca/forum/logonHelp.asp.
To access the document click on the discussion section for the Pacific Region.

You can also access summary documents from each region by entering each of the on-line discussion areas on the forum (Atlantic, Quebec, Ontario, Prairies).

You can also receive an emailed copy of the documents by contacting Aileen Anderson at (604) 533-6160 (aanderson@tol.bc.ca) or Andrew Appleton at (604) 724-8626 (aappleton@tol.bc.ca)

Framework Development for a Canadian Biodiversity Index

Workshop 10C—2 to 3:30 p.m., Thursday, April 3, 2003

Coordinator and presenter:
Dr. Risa Smith, Environment Canada
Presenters:
Greg Jones, British Columbia Ministry of Environment, Lands and Parks
Dr. Malcolm Gray, British Columbia Ministry of Sustainable Resource Management

The Canadian Biodiversity Index is a new reporting tool being developed by the Federal/Provincial/Territorial Biodiversity Working Group to provide policy-makers, decision-makers, managers and the Canadian public with a clear, easy-to-understand message on the state of biodiversity in Canada.

The purpose of the Canadian Biodiversity Index (CBI) is:

- To report on biodiversity in a meaningful, concise and easy to understand way.
- To assess the success of biodiversity management in Canada.
- To meet some of the reporting requirements of the Canadian Biodiversity Strategy.

The project is being led by the Federal/Provincial/Territorial Biodiversity Working Group, and being championed by the Environmental Reporting Branch at Environment Canada. It is being developed using an inclusive approach, gathering input from experts in biodiversity both inside and outside the government. To date, more than 200 people have been involved in the development and consultation process. This user-driven approach ensures a practical, useful tool is the end result.

The Canadian Biodiversity Index will measure progress towards achievement of **desired future states** for biodiversity in terrestrial and aquatic ecosystems across the country. These will be informed by historic baselines and ecological thresholds, and will be determined by the jurisdiction responsible for monitoring the ecosystem. The results of progress towards achieving desired future states for each ecosystem will be aggregated into a status for biodiversity across the country. The CBI is not intended to be a single number that represents biodiversity in Canada. A possible aggregation is depicted in Figure 1 below.

Indicators relevant to the ecosystems being assessed will be identified in four theme areas (Figure 2). Monitoring information to support the indicators will be collected at the ecosystem level and held by the parties doing the assessment. Data will be accessible through a distributed database model, allowing jurisdictions, policy-makers and scientists to drill down through the various data layers to the data source. Methodologies used for data collection, analysis, interpretation and aggregation will be transparent. The Index is not tied to a particular ecological classification system to maintain flexibility and regional relevance. The information will be able to be aggregated in a variety of ways (i.e. by habitat type, theme area, jurisdiction).

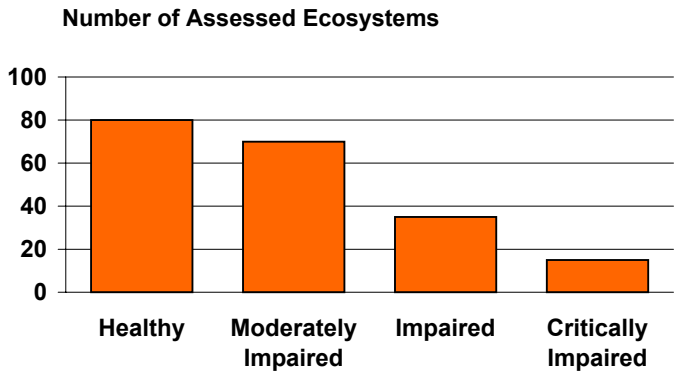

Figure 1. Mock-up of Canadian Biodiversity Index

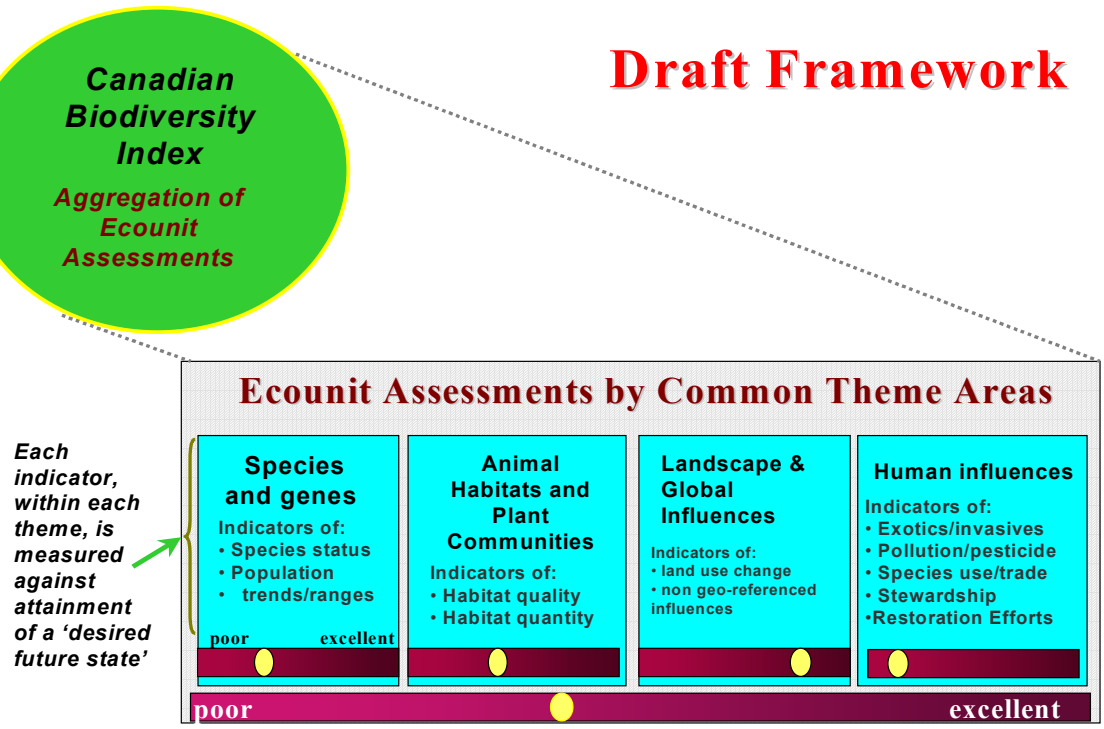

Figure 2. Canadian Biodiversity Index Draft Framework

Presentations were made on the *Vision and Framework for the Canadian Biodiversity Index* (R. Smith); *Preliminary Proof of Concept Testing on BC data* (M. Gray); and *Compatibility with Provincial Directions on Biodiversity Monitoring and Reporting* (G.Jones). Three background papers have been written to date to aid in the selection of desired future states: one explores the feasibility of using scientific thresholds to determine desired future states; one identifies established biodiversity objectives in Canada and evaluates their usefulness as desired future states; the third looks at existing biodiversity objectives in one province, BC.

The Canadian Biodiversity Index is being developed using a phased approach. Phase 1, Framework development, is complete. Phase 2, Proof of concept testing is in the early stages. Future phases include: Database development; creation of a User's manual; and an implementation strategy. Anticipated completion is 2006.

Several organizations have expressed interest in being involved in this initiative, including many provincial governments, Statistics Canada, Parks Canada Agency, Natural Resources Canada, Agriculture and Agri-Foods Canada, Canadian Museum of Nature, University of Ottawa, and several non-governmental groups.

For more information please contact Risa Smith, Knowledge Integration Directorate (819)994-90570 risa.smith@ec.gc.ca or Robin MacKay, National Indicators and Reporting Office (819)953-9272, robin.mackay@ec.gc.ca

Advancing Landscape Assessment and Planning

Informal Workshop—3:30 to 5 p.m., Wednesday April 2, 2003

Summary and Follow-up Round-table Discussion

Moderator:
Will Hall, Snohomish County Surface Water Management

Facilitators:
Renee Dagseth and **Krista Mendelman,** U.S. Environmental Protection Agency

Objectives:
The objectives for this workshop session were:

- To increase our collective understanding of how to use, improve upon, integrate, and make more readily available those existing and emerging tools and methods that are scientifically sound, relevant to current policy development, and credible to local communities.
- To document a general set of recommendations that can be used by both researchers and local practitioners to strengthen the alignment and relevance of their respective roles and work efforts.

Forum:

- Present brief summaries of preceding sessions of the conference track.
- Compile feedback and input on the most valuable and relevant characteristics of the tools and methods discussed.
- Identify the types of questions that the suite of tools would be able to address.
- Suggest characteristics of an integrated suite of tools that would be more relevant and readily usable by local practitioners.

Leading Questions and Round-Table Discussion Summary:
After having moderators of previous sessions provide their session summary, the round-table discussions focused around the following questions:

1. What are your **most important areas (geographical or programmatic)** where analysis of land-cover and watershed conditions could assist you in making decisions?

Discussion

- Need to identify areas that have:
  - The least ecological value. Target these areas for development.
  - The most ecological value. Protect these through resource planning and management provisions.

- Technical and organizational methods for efficiently linking data and assessment methods across different scales, particularly between watershed, stream reach, and parcel scales (e.g. common availability of either core data set or assessment method compatibility).

- Need to link watershed scale smart-growth concepts with site-specific, low-impact development methods.

2. What do you think would be the most **important questions** that a set of tools would need to answer for it to be useful for you?

Discussion

- Initially, it is a matter of **defining what questions** to answer, and then on to addressing which tools and information to use. For example: If information and assessments are intended to support land-use decisions (e.g. how can land use and development be planned and conducted in the least impacting manner?), then the

scale of information needs to be relevant to the scale of those decisions. In this case of land-use planning applications, that would range from the watershed scale down to the zoning and parcel scales. This inherently requires higher resolution information.

- Further using this example, 1:24,000 scale data sets are often not precise enough for parcel-level decisions and must be verified, updated, or refined to accurately describe the locations of streams and shorelines relevant to parcel decisions and boundaries. An example of this is the fact that most 1:24,000 stream location data sets do not match up with existing parcel and ownership maps, making it difficult to include the information in parcel and sub-division scale analysis. A simple improvement in this data set (i.e. through acquisition of LIDAR data) could facilitate the inclusion of stream and watercourse information into basic planning analysis.

- Need greater understanding of green infrastructure in urban and urbanizing areas (particularly relevant to stormwater management systems and capacities.) What are systems capable of providing with respect to their potential to retain and dissipate flood-water, to protect water quality and habitat, and to provide for a diversity of recreational opportunities.) What are the differences in infrastructure costs under different approaches?

- Need tools/methods to evaluate and characterize the success and/or limitations of various policy options (e.g. are we going to be able to protect the remaining watersheds where strong salmon populations remain; and are degraded watersheds restorable under current planning and management approaches?)

- Monitoring, particularly of local conditions and trends is critical. Information about the condition and relevance of specific places within a watershed planning area helps define the scope, relevance, and priorities of local programs and interests. Monitoring data and assessment information help convey relevance of issues among public and stakeholders. Without some base of monitoring, initial questions are general ones about the condition and function of the resource or ecosystem.

- Performance based planning and management requires:
  - Specific management questions.
  - Relevant and supportive monitoring.
  - Mechanisms for adjustments in planning and management.

3. **What barriers** make it difficult for you to use existing information and landscape analysis tools?

- There is a disconnect—we're good at developing these models but they aren't being used.

- Science doesn't fit very well into planning processes:
  - There is a chasm between sophistication of academic community and experience of practitioners: Research community—high level of scientific and literature knowledge, often low level of direct application experience. Local planners—low level of scientific-literature knowledge, but a high level of experience in application of environmental planning programs. Need bridge, need to involve end users as early as possible preferably right from the beginning.

  - Data and information need to be available when needed for management goal/questions. Such integration is not natural across such a broad array of individually maintained, and highly program-specific information.

- How do you get to joint learning? Through co-involvement and common experience.

- Local capacity and involvement issues include:
  - Time
  - Money
  - Staff knowledge
  - Level of public support

- Need vision that green infrastructure is critical as a system, not just an area. Idea of critical areas being a natural network for multiple functions including water quality protection, flood retention and dissipation, habitat, recreation, etc. is re-affirming for their protection and maintenance.)

- Current policy tools are less powerful as applied to idea of green infrastructure and system-scale protection. Regulations are often implemented in a more *ad-hoc* way and with narrower program objectives in mind. This is where planning scale changes have the potential to change basic development and transportation patterns.

Other Barriers to changing landscape development patterns:

- Potential cost differential in getting low impact development through local permitting processes. But also must consider some hard costs through taxes (e.g. infrastructure) **plus** social value costs.
- The tools presented don't appear to incorporate socio-economic values (energy reduction costs, cost of compact development).
- Communication that is too complex can hinder acceptance of new approaches. Need to keep it simple, particularly with respect to approach inputs and outputs, even though there are complex issues to be evaluated.
- Real estate values. No real pressure yet to protect resources when land values so high.
- Development rights to land. In both Canada and US, local jurisdictions can down-zone land parcels to some extent, but land cannot be made "undevelopable."
- In BC, private landowners cannot be compensated for option value—only actual investment.
- Lack of computer and technical literacy can also make it difficult to use some of the available tools. Need multimedia/face-to-face meetings and cross training sessions.
- Tools can be difficult to transfer.
- Scale/difficult to transfer (Quest) to different areas.
- Too many tools to know which one to use.

4. How does a local jurisdiction decide what questions to answer and which tools and models generally apply?

- Need to tie in Economic analysis with the existing planning and assessment tools:
  - Costs of unsustainable development
  - Benefits of natural resources
- Hazard assessment should look across hazards. Current tools are water-quality chemistrycentric leaving out larger scale biodiversity and wildlife corridor issues.
- Political leaders, planners, citizens, business leaders ask different questions.
- For example, with the exception of perceived local economic systems, there seems to be a disconnect between systems-type questions and site-specific decisions, particularly land-use decisions.
- Are decisions and environmental values based on science? What social science is needed? In U.S., mostly when we talk about "science" based-decisions, we mean biological, physical, and chemical science. What about social science? What science do we have, what do we need?
- In hard costs, we are paying more for hard infrastructure than green. Local fiscal costs of re-creating systems—that poorly replicate natural systems that could provide the same functions—would seem an obvious gaff in local land use policies.
- Do available planning tools involve enough people (critical mass) to support innovative planning decisions?
- Set of questions citizens and planning boards **have to ask** (e.g. tied to regulation) and **want to ask** (e.g. quality of life) and **might ask** (e.g. what does science indicate) if they knew more. These are likely to be different.
- Need to recognize that not making a decision has consequences.
- A tool can answer 'What will the future look like'?

- Opportunity for feed back from public. Is the current direction the direction we would choose?

- What will the future look like? With monitoring and public feedback loop and "what-if" scenarios and alternatives, how widely could land development patterns be changed?

5. What other requirements or specifications would you suggest that could help make landscape information and analysis more useful in local decisions (e.g., scale, resolution, types of data, easy-to-use front end)?

- Test the model by asking the questions that planners will ask.

- A tool that describes: How to knit together regional to site scales?

- Tools need characteristics of transparency. Models need to be communicated as uncertain. Should include ability to ask questions and test hypotheses.

- Make **time** part of model and therefore part of decision. Who are we planning for?

- Emphasize searchable tools to minimize up-front information overload. There can be too much information. Allow users—who need more detailed information in some areas—to get it without needing to manually filter through all information in all areas. The system should enable this quick filtering through the use of nested hierarchical scales.

- What are the objectives? What do I need to know? What do I need to access? This should help answer the question.

- Use partnership in development so there is representation from folks who apply and use the model.

- Need to connect projects to outcomes for elected officials

- Help bridge gap between planners and elected officials—limit information so as not to overload, understand core mandates and areas for innovation.

- Need to use photos and connect to what it can do for the bottom line and in real life. Reports don't mean anything unless they can be made understandable to elected officials.

- Consider both new development and re-development. (e.g. Seattle SEA Street Project and other projects reported in "Natural Approaches to Stormwater Management: Low Impact Development in Puget Sound, Puget Sound Action Team, March, 2003.)

- Critical mass important how do you keep citizen attention throughout the process. Consider:
  - Using citizen engagement for local participation in issue resolution and decision-making similar to jury service.
  - Need to give equal share to citizens in decision-making. Decision-makers need to step back and let communities take a role in shaping themselves.

Other thoughts for consideration:

- Turn scientific modeling results into votes.
- Ask what is most cost effective in total sum, not just to development interests in the short run.
- Knit together scales.
- Believability of tool requires transparency. Must be transparent back to data.
- Disclaimer about model use, uncertainty. Models must be introduced as uncertain but need to balance certainty vs. flexibility.
- Make time an explicit dimension—for whom are we planning (current vs. future)
- Information overlooked?
- Use partnerships; get audience involved right up front.

- Council policy analyst: We're talking about **way** too much information. Can't support constantly shifting approach. Might need just a few parameters and ability to do what-if analysis. Evaluate uncertainty. Include outcomes and performance measures. Prefer to get straight answers from scientists, not jargon. **Less detail.** Elected officials just don't have much time for this
- What can habitat do for them?

Round-table Summary Comments:

- Tools should encourage broad, engaged, involvement. Critical to involve the public, so tools should be accessible, multi-media, simple interface (yet scientifically valid).
- Integrate other ecological values. But must also integrate socio-economic values, including cost of current unsustainable development and of loss of nature's services. **Must be combined.** Not just salmon, water, etc.
- Scientific integrity is important, but not enough. Need:
  - Clear risk communication.
  - Transparency of approach.
  - Simplified way of communication.
- Need multiple tools across scales.
- Future consequences/ values important to look at 1generation or 7 generations.
- Need to be clear– doing nothing is a choice.
- Timing of decisions is important.
- "What can LWD (large woody debris) do for elected officials?"
- Important to bridge the perceived "chasm" between academic work and practice.
- **Huge** list of potential applications of landscape analysis tools. And a need for a variety of tools—from basic inventories to sophisticated models—that can operate at regional, sub-regional, and site scale.
- What would the future look like? Need to illustrate options or alternative futures, **including** the plan-trend scenario.
- Time must be explicit component. Avoid too much emphasis on short-term elements.
- Must have transparency, but also avoid information overload for people who don't want/need data.
- **Communication** must keep it simple. Tools worthless unless we can translate.
- What can LWD (large woody debris) do for elected officials? Tie it to votes, community values.
- Keep people involved beginning to end to get political support for the plan.
- Must be able to address the "spectrum of issues" planners must consider—geomorphology to biology.
- Need for a Suite of tools:
  - Inventory, descriptive
  - Assessment—move from present to future state
  - Predictive models
  - Scenario tools that model human and natural systems.
  - Scenario tools to generate public opinions and inform public decisions through this consultation.
- Have: Statewide shoreline planning GIS tool; wetlands tool to decide if a project is sustainable. Need: Multi-media, GIS based information and decision support tool. Put them all the information in one place so people and permit agencies can use them.
- Easier to meet letter of GMA rather than substance. Current growth trajectories are problematic. Potentially large environmental, social, and economic opportunities could be associated with changes to our current patterns of land development and use.

Attachment
Characteristics of Useful Tools for Landscape Assessment and Planning

Straw Characteristics of a useful and integrated suite of landscape analysis and planning tools:
The challenge for developing such an assessment tool—or suite of tools—is to balance several potentially conflicting characteristics. Such as:

1. Building a tool that has enough resolution (spatially and temporally) to be realistic in its assessments of future conditions and meaningful to local decision makers.
2. Building a tool that operates at multiple scales and allows users and practitioners to link local action to regional change by carefully identifying appropriate scales for individual processes that are best approximated at particular scales (i.e. metropolitan growth vs. stream biology).
3. Building a tool that is able to explicitly represent multiple agents and sources of ecological stress (i.e. land use, pollution sources etc.) to be able to link human behaviors to ecological conditions.
4. Building on existing or easily accessible data to ensure that it can be operationalized and maintained by agencies with different capacity.
5. Building a tool that is sensitive enough to be able to test different policy scenarios and instruments at various scales.
6. Building a tool that facilitates adaptive management.
7. Should we make these models available to the public - if they are to be successful from a public policy perspective?

Focus of questions/applications for such a tool—or suite of tools:
One way of articulating this project is perhaps in the form of questions that this tool should address. This is a tentative list of questions that I think this tool should address:

1. What are the key goals, strategies, and priorities established for watershed management through Federal, State, and local legislation and plans in Puget Sound? (i.e. an inventory of current goals and visions)
2. How can we characterize the current watershed conditions in Puget Sound in terms of both ecological and socio-economic functions (with respect to these goals, strategies, and priorities)?
3. How do Puget Sound watersheds operate? What mechanisms link socio-economic patterns to ecosystem functions (i.e. urbanization or land use to ecological conditions, non-point source pollution)?
4. How do these conditions compare with pre-existing conditions and or “watershed health” conditions?
5. How will the landscape change in the next 20-30 years under different socio economic, biophysical, and policy scenarios? (I do not think we can realistically predict changes beyond this time scale)
6. What are the potential impacts of these scenarios on various socio-economic and ecological processes particularly with respect to identified goals (i.e. priorities by current legislation, see #1)?
7. What is the scientific uncertainty associated with these different impacts of alternative scenarios? and existing gap in knowledge?
8. What actions can be taken and respective tools can be to minimize these impacts at various scales?